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Systematic Literature Review

Pharmacoeconomics Education in the Middle East and North Africa Region: A Web-Based Research Project

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ABSTRACT

Objectives: Pharmacoeconomics (PE) is a relatively new science that is gaining special attention in many countries of the Middle East and North Africa (MENA) region that have limited healthcare resources. Therefore, education is crucial for capacity building in PE in the region. This study aimed to assess the current status of PE education in schools of pharmacy in the MENA region and shed some light on the role played by ISPOR chapters in PE education.

Methods: A survey containing 5 questions about PE education in 14 MENA countries was self-answered by 2 investigators after screening information available on college or school of pharmacy official websites.

Results: Of 176 schools of pharmacy in the MENA region, only 80 offer PE educational courses. Egypt and Jordan have the highest number of schools offering PE teaching, especially on the professional level for undergraduates. The graduate level of PE education was offered mostly in Iran and Egypt. The fundamentals of PE was the topic most taught, whereas decision analysis and modeling topics were the least taught topics. Different ISPOR chapters were found to play a crucial role in developing focused health economics education for better healthcare decision making.

Conclusions: There has been an increase in the number of schools of pharmacy offering PE education in the MENA region; however, PE education and research need improvement. Providing structured PE education should be encouraged to establish the infrastructure needed for allocation of limited healthcare resources. Furthermore, updating websites of schools of pharmacy is essential to obtain a complete picture of the PE education in the MENA region.

Keywords: pharmacoeconomics, pharmacoeconomics education, MENA region, pharmacy education, ISPOR.

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Introduction

Pharmacoeconomics (PE) is considered a newly developed and rapidly changing discipline. It is concerned with the examination and measurement of inputs and outcomes of pharmaceutically related healthcare interventions and drug therapy.[1,2]

Recently, the cost of healthcare services has gained attention for evaluation as well as effectiveness and safety.[3] The main importance of PE is the guidance of decision making in the presence of limited resources. The adoption of PE concepts poses a burden over pharmaceutical care providers to offer optimal services at the least possible prices.[4] In addition, PE plays an important role in the construction of formularies, reimbursement decisions, and management of drug therapies.[5]

Many factors and components should be secured to achieve successful implementation of PE. These include the presence of qualified PE professionals, properly educated policy makers, and organizations that serve as guiding bodies for the process.[6]

PE education should be offered to anyone who participates in the healthcare decision-making process.[7] Therefore, PE education for both professionals and graduate-level students is crucial to ensure the presence of highly skilled professionals who are capable of implementing health technology assessment (HTA) to inform decision-making process and, hence, achieve a better future for their countries and the people who receive healthcare services.[8] Saving resources and offering better services would be the main consequences of HTA capacity building in the presence of the proper HTA legislation, funding, and transparency.[8]

Furthermore, advanced education courses should be provided for those who are willing to perform pharmacoeconomic comparisons and modeling, whereas simple courses are required for people who just want to understand the basic knowledge and apply the results of these analyses.[8]

Pharmacists are among the professionals who can benefit most from studying PE.[9] The reason behind this is that PE is incorporated in all stages of drug manufacturing starting from research to marketing. Moreover, hospital pharmacists can make use of PE in clinical decision making and in the selection of drugs to be included in formularies.[9]

ISPOR plays an important role in PE education. It has many strategic goals,[10] which include the development of innovative

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methods to inform decision making, membership collaboration, and professional development through students' networks, career opportunities, interactions, and the development of high-quality education programs.

ISPOR established standardized learning outcomes to guide course directors and instructors regarding skill level (technical, social/ethical, and personal/professional) and different levels of desired outcomes depending on the target audience.[11] In addition, ISPOR played an important role in drawing a roadmap for the implementation of HTA in the Middle East and North Africa (MENA) region through conferences that involve stakeholders and healthcare professionals.[8]

There are many challenges to effective PE education and application in the MENA region such as the following[8,12,13]: (1) lack of experts and skilled professionals among pharmacists, researchers, clinicians, and stakeholders; (2) significant lack of pharmacoeconomic research and the poor quality of published research; (3) lack of attention to PE by governments and healthcare decision makers and the limited and variable application of PE principles and HTA in the health sector; (4) the nonmandatory nature of PE courses and their absence in some schools of pharmacy in some countries in the MENA region; and (5) the lack of pharmacoeconomic or submission guidelines in all countries of the region except Egypt, Iran, and Israel.[14]

PE education was evaluated in some countries outside the MENA region. Thomas et al[15] reviewed PE education in undergraduate courses globally (survey-based). In the United States, PE is part of the curriculum in almost all colleges and schools of pharmacy, but there was a large variation in the list of the covered topics and the number of teaching hours.[16] In Brazil, although most schools of pharmacy have discussed some pharmacoeconomic concepts in various courses, only 4 schools offered PE or HTA in their curriculum.[17] In Turkey, only 2 schools of pharmacy offered pharmacoeconomic education. In the Russian Federation, PE was offered by 35 schools of pharmacy where PE topics were compulsory in 25 schools and elective in others.[18] In Bosnia and Herzegovina, only 1 school of pharmacy offered PE as an undergraduate course.[19] To our knowledge, no recent studies have been conducted to evaluate PE education in European countries.

Few studies addressed the status of PE education in the MENA region. A total of 2 main surveys assessed the status of PE education regionwide in addition to some individual surveys carried out in some countries. The first survey reached was carried out by Nwokeji et al[2] in 2004, where they assessed the extent of PE education offered in schools of pharmacy outside the United States worldwide. The countries included from the MENA region in the survey were Algeria, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Palestine, Saudi Arabia, Syria, and the United Arab Emirates (UAE). The second survey was conducted in 2013 by Alefan et al,[20] where they evaluated PE education in the World Health Organization Eastern Mediterranean Region. The addressed countries included all countries of the MENA region except Algeria, Israel, and Malta. Some individual surveys were carried out in Egypt,[21] Lebanon,[22] Yemen,[23] the UAE,[15] and Saudi Arabia.[24]

Recently, PE and HTA have started to gain great attention in countries of the MENA region; however, their implementation is still at an early stage. To our knowledge, some governmental authorities, in addition to some hospitals, started making use of HTA for some healthcare decisions in their systems, such as Egypt, Saudi Arabia, Tunisia, Lebanon, Jordan, and the UAE.[8,25] In Saudi Arabia, HTA is obligatory for high-cost medications.[8] As initial steps, an HTA agency has been authorized in Tunisia at a national level and in Jordan at a local level. Furthermore, Kuwait is discussing the inclusion of an HTA system, and Egypt and Saudi Arabia have decided to develop an HTA agency in their 2030 healthcare vision.[25] Some schools of pharmacy in the MENA region have similarly included PE in their education courses plan for capacity building in this field.

The main purpose of this study was to provide a comprehensive overview of the current situation of PE education in the whole MENA region through the screening of the websites of the different schools of pharmacy. In addition, the ISPOR website was screened and evaluated to throw some light on the role of ISPOR chapters in PE education in the MENA region.

Methods

A modified survey was designed to collect data about pharmacoeconomic education among different schools of pharmacy in the MENA region. The countries included from the MENA region in this study were Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, the UAE, and Yemen.[26] A listing of colleges and schools of pharmacy in each country in the MENA region was obtained from the websites entitled "List of Pharmacy Schools"[27] and the official world list of pharmacy schools.[28] After reviewing the PE education literature,[2,15-24] a modified survey consisting of 5 main questions was generated. A total of 4 questions were similar to the survey updated in 1997[29]: (1) whether the syllabus of the college or school of pharmacy offers PE education and at what degree level (professional or graduate); (2) the number of credit hours devoted to PE education; (3) whether PE courses are considered as part of required or elective curriculum; (4) the topics covered by these courses with a brief description, if available; and (5) a new question—"Are there any prerequisites for PE courses?" Questions concerning the number of students receiving these courses each year and the main resources and references used in preparing PE lectures were omitted. All questions were close-ended except question 4. In addition, the role of ISPOR chapters in the countries of the MENA region and their contributions in PE education and training were investigated based on the latest annual reports available on ISPOR's official website.[30]

A website-based search was used to self-answer the survey questions; 2 independent investigators self-answered the above 5 questions after screening information was made available to the general public on the college or school official website. Each website was assessed independently by 2 blinded investigators. There was a complete agreement between the investigators on abstracted data; the abstracted information was obtained by answering the survey questionnaire and was used to fill the data collection sheet for each country in the MENA region. Data collection items included the following: (1) numbers, names, and website of the schools of pharmacy in each country; (2) names of schools that taught PE and the level of education—professional or graduate level; (3) whether the offered courses are part of the required or elective curriculum; (4) the academic departments that teach PE; and (5) the topics that are mostly taught in these PE courses, description, credit hours, and prerequisites for PE, if mentioned. Moreover, if the country has an ISPOR chapter, the contribution of ISPOR in PE education and training was added. The data collection sheet was pretested with 3 different websites. Websites in Arabic, French, Persian, or Hebrew were translated to English.

No attempt was made by authors to contact the included schools of pharmacy and provide any additional information that

Table 1. Summary of the current status of PE education in countries of MENA region (website screening).

Country	Number of schools of pharmacy		Level of education*			Total number of PE courses*	
	Total	Offering PE education, n (%)	Professional level,† n (%)	Graduate level,‡ n (%)	Both levels, n (%)	Required curriculum	Elective course
Bahrain	1	1 (100)	1 (100)	-	-	-	1
Egypt	34	18 (52.9)	15 (83.3)	3 (16.67)	-	21	4
Iran	18	6 (33.3)	2 (33.3)	3 (50)	1 (16.7)	6	-
Iraq	18	10 (55.6)	10 (100)	-	-	9	1
Israel	2	2 (100)	2 (100)	-	-	2	-
Jordan	14	13 (92.8)	11 (84.6)	-	2 (15.3)	16	3
Lebanon	5	5 (100)	2 (40)	1 (20)	2 (40)	4	3
Malta	1	1 (100)	1 (100)	-	-	1	-
Oman	3	2 (66.6)	2 (100)	-	-	2	-
Qatar	1	1 (100)	1 (100)	-	-	1	-
Saudi Arabia	18	8 (44.4)	8 (100)	-	-	8	-
State of Palestine	4	2 (50)	2 (100)	-	-	1	2
Syrian Arab Republic	12	4 (33.3)	4 (100)	-	-	4	-
United Arab Emirates	8	7 (87.5)	4 (57.1)	1 (14.3)	2 (28.6)	9	-

Note. Algeria, Djibouti, Kuwait, Libya, Morocco, Sudan, Tunisia, and Yemen are not mentioned in the table because of the absence of information about PE education in these countries per website screening.
MENA indicates Middle East and North Africa; PE, pharmacoeconomics.
*In all schools of pharmacy teaching PE.
†Professional level includes BSc or PharmD.
‡Graduate level includes MS, PhD, or Diploma.

may have not been included on the website. Colleges and schools offering PE training at the Bachelor or PharmD degree level were categorized as providing professional-level PE education, whereas those offering PE courses at the MS, PhD, or Diploma degree level were categorized as providing graduate-level education. Descriptive statistics for nominal data such as count, frequencies, and percentages were calculated to describe the results. All analyses were performed using Microsoft Excel 2019.

Results

A summary of the current status of PE education in countries of the MENA region (websites screening) is described in Table 1. About 176 schools of pharmacy are present in the countries of the MENA region, out of which 80 schools offered PE educational courses. It has been found that the largest number of schools of pharmacy was found in Egypt (34 schools) and Saudi Arabia (18 schools), whereas no schools of pharmacy were available in Djibouti, and only 1 school was found in Bahrain, Kuwait, Tunisia, and Malta. Nevertheless, PE was not among the curricula in some of these available schools of pharmacy. The largest number of schools of pharmacy teaching PE was found in Egypt (18 schools) and Jordan (13 schools).

The level of education in most schools of pharmacy teaching PE was mainly professional, especially for undergraduate students. Nevertheless, graduate-level education was also provided in some schools in Egypt, Iran, Jordan, Lebanon, and the UAE.[31-42] Egypt and Jordan have been found to offer the highest number of PE courses at the professional level,[31,35,36,41,43-68] whereas Iran and Egypt were considered to offer the highest number of PE courses at the graduate level.[31-34,41,69]

Teaching PE courses in schools of pharmacy can either be elective or mandatory. Most of these courses were mandatory and part of the required curriculum, with the highest number of courses noted in Egypt and Jordan.[31,32,35,36,41,43,45-68] Elective courses were also provided at both professional and graduate levels in Egypt, Iraq, Jordan, Lebanon, and Palestine.[35,37,38,44,51,56,58,65,70,71]

It has been found that the Department of Clinical Pharmacy and Pharmacy Practice mostly offered PE courses in most countries. Furthermore, the Drug Technology Department, the Pharmaceutics Department, and the Pharmacoeconomy and Administrative Pharmacy Department were also among the departments teaching PE courses in countries of the MENA region.[31-33,38,45,50,52,57,58,61]

Topics that were mostly taught in schools of pharmacy include the fundamentals of PE, types of costs, perspectives, outcomes and PE evaluations (cost-benefit, cost-effectiveness, cost-utility, cost minimizations, cost-of-illness and cost consequences), health-related quality-of-life analysis, evaluation of PE literature, future challenges in PE, the role of the pharmacist as a decision maker inside the healthcare community and pharmaceutical industry, discounting in health costs, and drug pricing.[31,35-39,43,51,54,58,60,61,63,64,70,72-81] Decision analysis and modeling topics were rarely taught at both graduate and professional levels in the available schools of pharmacy.[36,64,70,75,81,82]

The role of ISPOR in countries of the MENA region and its contributions in PE education and training were investigated.[30,83] One of the most important roles of ISPOR is to provide many

educational and training programs to promote the understanding and use of Health Economics and Outcomes Research (HEOR) methods and analyses, which will lead to improvement of healthcare decision making.[11] Although ISPOR has many regional chapters worldwide, only 10 countries in the MENA region have ISPOR chapters, which include Algeria, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Qatar, Saudi Arabia, and the UAE.[30] The ISPOR Arabic Network, which was established in May 2011 and includes all the above-mentioned countries except Iran and Israel, provides a platform for ISPOR to grow and expand its activities in Arab-speaking countries.[84] It is worth noting that Egypt and Algeria are also members of the African Network.[85]

Knowledge and skill building are considered the core of the ISPOR mission. The different ISPOR chapters in countries of the MENA region were found to have a crucial role in developing focused health economics education.[11,30] On the basis of the latest annual reports of the ISPOR chapters in the MENA region, some activities were organized for students and new professionals that help in capacity building.[30] In Egypt, many educational courses about PE were provided in research institutes and faculties in addition to the use of chapter funds and scholarships to raise capabilities.[86] In Iran, they played a crucial role in PE education by conducting educational programs, conferences, journal clubs, and workshops.[87] In Israel, the role was mainly by encouraging students to attend conferences and providing them facilities to do so.[88] In Lebanon, the Lebanese Society for Pharmacoeconomics and Outcome Research organized an educational workshop on HTA in February 2018.[89] In Jordan, engagement with pharmacy students is about to start at Yarmouk University.[90] The regional chapters in Kuwait, Qatar, and the UAE are affiliated with the Kuwait University School of Pharmacy, Qatar University, and the University of Sharjah, respectively.[91-93] In Saudi Arabia, promotion of the chapter was achieved through engagement with students during scientific events.[94] In Algeria, no activities were organized for students or new professionals.[95] All countries in the MENA region that have ISPOR chapters[30] offered PE education in their schools of pharmacy, except Algeria for which no information was available about PE education on the websites of schools of pharmacy.

Discussion

To our knowledge, this is the first study to assess PE education in the whole MENA region through the screening of websites of different schools of pharmacy, in addition to shedding light on the role of ISPOR chapters in PE education in countries of the MENA region.

Although the number of schools of pharmacy in most countries of the MENA region has increased in number compared with the previous studies,[20,21,96] only 45.45% of the screened schools offered PE education, either as separate courses or as a part of another course. This may be attributed to the heterogeneity of the healthcare system and the insufficient implementation of HTA because it is not included in the legislation as an obligatory step for pricing and reimbursement decision. Furthermore, the lack of awareness of the decision makers and academics about the importance of PE poses a barrier to adopting PE courses into the curriculum of the MENA region schools of pharmacy.[20] In addition, the screened websites might not have been recently updated.

Of the 80 schools of pharmacy that offered PE education, 65 provided PE education at the professional level, 8 at the graduate level, and 7 at both levels. Undergraduate students had more access to PE education compared with graduate students. This comes in agreement with the small number of published studies in the region.[12] Fasseeh et al[8] reported that some universities in Egypt, Jordan, and Lebanon have already included HTA-related subjects in the curricula of pharmacy. This is in line with the findings of this article, where Egypt and Jordan have the largest number of schools of pharmacy teaching PE.

The total number of courses that offered PE education in the region was 98, of which 85.7% were mandatory and 14.3% were elective. This is considered a good initial step to make PE education mandatory for undergraduate students.

The fundamentals of PE was the most taught topic, whereas decision analysis and modeling were rarely taught. This may be due to the currently limited options for the HTA training of healthcare professionals and academics.[8] It has been found in most countries that the Clinical Pharmacy and Pharmacy Practice departments were the most likely to teach PE courses because PE is considered an integral part of clinical pharmacy and outcome research.[97]

Results of this study have shown that the percentage of schools of pharmacy in the MENA region that offered PE education has increased compared with the 2 previous surveys that were conducted in 2004 and 2013.[2,20]

In the 2004 survey, only 4 colleges in 4 countries in the MENA region provided usable responses to the sent questionnaires, namely, Lebanon, Jordan, Palestine, and Malta. Among these, only 2 schools of pharmacy (1 in Lebanon and the other in Malta) provided PE education at a professional level with no graduate-level courses.[2]

In the 2013 survey, the highest number of schools of pharmacy in the MENA region was found to be in Egypt.[20] Of the 26 schools addressed, only 3 responded and only 1 of them stated that PE is taught to its students, which was the German University in Cairo. Saudi Arabia came in second with 16 schools of pharmacy, of which 3 responded and 2 were found to offer PE courses to their students. Iraq came in third with 14 schools of pharmacy, of which 5 schools responded and all claimed to teach PE courses to their students. Bahrain and Djibouti were identified to have no pharmacy schools. In addition, colleges in Iran, Libya, Morocco, and Tunisia did not offer usable responses. Approximately 68% of the schools of pharmacy that responded stated that they offered some sort of PE education.[20]

A limited number of studies assessed the status of PE education in individual countries in the MENA region. Soliman et al[21] did so in Egypt in 2011-2012, where they stated that 7 (35%) schools of pharmacy out of a total of 24 offered PE education, either as separate courses or as part of another course, compared with 18 (52.9%) schools out of 34 in this study. In the mentioned article, the graduate-level courses were offered by 4 schools of pharmacy, which were Ain Shams University, Egyptian Russian University, Alexandria University, and Sinai University, compared with 3 schools of pharmacy in this article, which were Ain Shams University, Alexandria University, and Tanta University. For Sinai University, no information was available on whether it offered PE education on its website. Furthermore, from the 8 schools that intended to offer PE courses as a part of their future plans in the mentioned article,[21] only 4 offered PE education as a part of other courses for undergraduate students in this review.[43,49,50,52]

In Lebanon, Khachan et al[22] evaluated the legacy of pharmacy education in 2010, in which PE was found to be taught in 2 universities: Saint Joseph University, representing the French system of education in Lebanon, and the Lebanese American University, representing the American system. It is worth noting that PE was not introduced by the Lebanese University, which represents their national system. In this article, all the schools of pharmacy in Lebanon offered PE education.

In Yemen, a recent letter to the editor published in 2017 showed that there were 16 colleges of pharmacy in Yemen and that PE is offered in some of them as part of their courses but not as a separate course.[23] Nevertheless, in this article, no information was available about PE education on their websites.

In 2015 in the UAE, according to a review that assessed the introduction of PE courses in undergraduate pharmacy programs globally, PE courses were found to be introduced in 5 schools of pharmacy.[15] In this study, there were 8 schools of pharmacy in the UAE, of which 7 schools offered PE.

In Saudi Arabia, according to an article published in 2010, the Faculty of Pharmacy in King Saud University offered separate PE courses in the fifth and the sixth year of the PharmD program,[24] whereas in this study, 8 schools of pharmacy offered PE education at the professional level. In the Faculty of Pharmacy at King Saud University, there was a pharmacoeconomic research unit.[98] No information, however, was available about PE education on the university website.

ISPOR provides crucial regional support through the Arabic Network by holding free online resources, expert consultations, and annual meetings.[10,99] ISPOR leads the development of HEOR-focused education and training programs. The core curriculum for HEOR education and training is developed and delivered by ISPOR.[10] ISPOR also opens contact channels between academic and nonacademic members to encourage relevant university programs that best prepare students for employment in HEOR-related careers. Furthermore, they supply their members with access to career and skill-enhancing tools beyond HEOR through partnerships.[10]

Because PE plays an extremely important role in pricing and reimbursement decisions, promotion of health insurance, rational use of drugs, and the allocation of limited healthcare resources,[8] the following recommendations should be adopted to follow the steps of the high-income countries where PE is well established and important to the policy-making process[8,100,101]: (1) development of pharmacoeconomic or submission guidelines to improve the quality and transparency of pharmacoeconomic evaluation studies and HTA in healthcare; (2) inclusion of principles of PE and HTA-related subjects among mandatory courses in the curricula of all schools of healthcare sectors at the undergraduate and graduate level; (3) HTA capacity building by holding and funding intensive training programs for academics, healthcare professionals, and stakeholders by attending international conferences, workshops, and educational courses; (4) development of a pharmacoeconomic research institute or HTA agency for each country in the region to support, fund, and facilitate economic evaluation research to help decision makers to best allocate scarce resources; (5) development of country-specific tariffs for the calculation of quality-adjusted life-years to represent the views and health preferences of the population in the region; and (6) inclusion of HTA in the legislation as an obligatory step for pricing and reimbursement decision for new technologies and proper funding.

Limitations

Some of the websites of schools of pharmacy were not updated or were in languages other than English, such as French (Algeria, Morocco, and Tunisia), Persian (Iran), and Hebrew (Israel), and some others were under construction, not working, or did not mention the details of the teaching curriculum. The research engines chosen to identify pharmacy schools in the MENA countries, although user-friendly and widely used by most public internet users, did not necessarily provide an accurate, complete, and updated picture of the pharmacy schools in the MENA region. This not only posed a challenge to the authors but can also pose a challenge to students and users of these websites who may not be able to choose pharmacy schools that offer the courses they are looking for.

Conclusion

In the MENA region, although the number of schools of pharmacy that offered PE education has increased in number, PE education and research need a lot of improvement. Providing structured PE education and research should be encouraged and offered to anyone who participates in the healthcare decision-making process. This is to establish the required PE infrastructure needed for the allocation of limited healthcare resources and inform the decision-making process. Furthermore, updating websites of schools of pharmacy is essentially needed to obtain a complete picture of the pharmacoeconomic education in the MENA region.

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